CLAIMS:

1. A process for producing a titanium-containing silicon oxide catalyst satisfying all of the following conditions (1) to (3);

(1) an average pore diameter is 10Å or more,

(2) 90% or more of the total pore volume has a pore diameter of 5 to 200Å, and

(3) a specific pore volume is 0.2 cm^3/g or more,

which comprises the following first to fourth steps:

first step: a step of obtaining a solid containing a catalyst component and a template by mixing and stirring a silica source, a titanium source and a quaternary ammonium ion as a template in a liquid state;

second step: a step of removing the template from the solid obtained in the first step by solvent extraction;

third step: a step of substituting the solvent used for the extraction which was contained in the solid after the removal of the template, with a solvent which is substantially inert to a silylating agent to be used in the following fourth step; and

fourth step; a step of obtaining a silylated catalyst by subjecting the solid obtained in the third step to silylation.

2. The process according to claim 1, wherein the solvent for substitution used in the third step is the same as the solvent for silylation used in the fourth step.

3. The process according to claim 1 or 2, wherein the template used in the first step is a quaternary ammonium ion

represented by the following general formula (I) is used as a template and then the template is removed

$$[NR^1R^2R^3R^4]^+ \qquad (I),$$

wherein, R^1 represents a linear or branched hydrocarbon group having 2 to 36 carbon atoms, and R^2 to R^4 represent an alkyl group having 1 to 6 carbon atoms.

4. The process according to any one of claims 1 to 3, wherein the process further comprises a step of molding the solid containing the catalyst component.

5. The process according to any one of claims 1 to 4, wherein the solvent for extraction is an alcohol.

6. The process according to claim 5, wherein the alcohol is methanol.

7. The process according to any one of claims 1 to 6, wherein the solvent for substitution is a hydrocarbon.

8. The process according to claim 7, wherein the hydrocarbon is toluene.

9. A titanium-containing silicon oxide catalyst obtained by the process according to any one of claims 1 to 8.

10. A process for producing an oxirane compound, which comprises reacting an olefin type compound with a hydroperoxide in the presence of the catalyst of claim 9.